

WHAT IS CLAIMED IS:

1 1. A method of ensemble averaging signals in a pulse oximeter,
2 comprising:
3 receiving first and second electromagnetic radiation signals from a blood
4 perfused tissue portion corresponding to two different wavelengths of light;
5 obtaining an assessment of the signal quality of said electromagnetic signals;
6 selecting weights for an ensemble averager using said assessment of signal
7 quality; and
8 ensemble averaging said electromagnetic signals using said ensemble
9 averager.

1 2. The method of claim 1 wherein said obtaining an assessment of said
2 signal quality comprises obtaining a measure of the degree of arrhythmia of said signals.

1 3. The method of claim 2 wherein said obtaining an assessment of said
2 signal quality further comprises obtaining a measure of the degree of similarity or correlation
3 between said first and second electromagnetic radiation signals.

1 4. The method of claim 1 wherein said obtaining an assessment of said
2 signal quality comprises obtaining a measure of the degree of motion artifact present in said
3 signals.

1 5. The method of claim 4 wherein said obtaining a measure of the degree
2 of motion artifact comprises obtaining a ratio of a current pulse amplitude to the long-term
3 average pulse amplitude of said signals.

1 6. The method of claim 1 wherein said obtaining an assessment of said
2 signal quality comprises obtaining a ratio of a current pulse amplitude to the previous pulse
3 amplitude of said signal.

1 7. The method of claim 1 wherein said obtaining an assessment of said
2 signal quality comprises obtaining a measure of the degree of the overall signal quality metric
3 for a single pulse, which metric is itself a combination of several other metrics.

1 8. The method of claim 1 wherein said obtaining an assessment of said
2 signal quality comprises obtaining a ratio of a current pulse period to that of an average pulse
3 period of said signals.

1 9. The method of claim 1 wherein said selecting weights comprises
2 forming a combination of one or more parameters selected from the group consisting of a
3 measure of the degree of arrhythmia of said signals, a measure of the degree of similarity or
4 correlation between said first and second electromagnetic radiation signals, a measure of the
5 degree of motion artifact by obtaining a ratio of a current pulse amplitude to the long-term
6 average pulse amplitude of said signals, a ratio of a current pulse amplitude to the previous
7 pulse amplitude of said signal, and a ratio of a current pulse period to that of an average pulse
8 period of said signals.

1 10. A device for ensemble averaging signals in a pulse oximeter,
2 comprising:
3 means for receiving first and second electromagnetic radiation signals from a
4 blood perfused tissue portion corresponding to two different wavelengths of light;
5 means for obtaining an assessment of the signal quality of said
6 electromagnetic signals;
7 means for selecting weights for an ensemble averager using said assessment of
8 signal quality; and
9 an ensemble averager for ensemble averaging said electromagnetic signals
10 using said weights.

1 11. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a measure of the degree of
3 arrhythmia of said signals.

1 12. The device of claim 11 wherein said means for obtaining an
2 assessment of said signal quality are further configured for obtaining a measure of the degree
3 of similarity or correlation between said first and second electromagnetic radiation signals.

1 13. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a measure of the degree of
3 motion artifact present in said signals.

1 14. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a ratio of a current pulse
3 amplitude to the long-term average pulse amplitude of said signals.

1 15. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a ratio of a current pulse
3 amplitude to the previous pulse amplitude of said signal.

1 16. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a measure of the degree of the
3 overall signal quality metric for a single pulse, which metric is itself a combination of several
4 other metrics.

1 17. The device of claim 10 wherein said means for obtaining an
2 assessment of said signal quality are configured for obtaining a ratio of a current pulse period
3 to that of an average pulse period of said signals.

1 18. The device of claim 10 wherein said means for selecting weights are
2 configured for forming a combination of one or more parameters selected from the group
3 consisting of a measure of the degree of arrhythmia of said signals, a measure of the degree
4 of similarity or correlation between said first and second electromagnetic radiation signals, a
5 measure of the degree of motion artifact by obtaining a ratio of a current pulse amplitude to
6 the long-term average pulse amplitude of said signals, a ratio of a current pulse amplitude to
7 the previous pulse amplitude of said signal, and a ratio of a current pulse period to that of an
8 average pulse period of said signals.